

FINAL REPORT

Grant #: N00014-97-1-1005

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GRANT TITLE: Acoustic Ecology of the Minke Whale

REPORTING PERIOD: 1 July 1997 to 30 July 1998

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OBJECTIVE: To determine the feasibility of studying the vocal behavior off minke whales off the coast of Queensland Australia. With an ultimate goal increasing our understanding of the vocal repertoire, the behavioral context and the source level of sounds produced by these animals.

APPROACH: Calls of minke whales, *Balaenoptera acutorostrata*, off the coast of NE Australia in July of 1997 were recorded utilizing a newly described population where minke whales maintain long contacts with vessels. A hydrophone array was used to link minke whales with a wide variety of new sounds, including a unique vocalization (Gedamke et al, 1997) that can be heard over long distances and used to remotely track animals' movements.

Recordings were made in the presence of minke whales aboard the vessel "Undersea Explorer" using a calibrated, two dimensional hydrophone array (5 "High Tech Inc." hydrophones, flat +/- 2db 50-32,000kHz). Surface and in-water observers noted locations, movement and behavior of whales. Spectral characteristics, received levels, and source levels of vocalizations were determined in Canary 1.5, Cornell's bioacoustics software. Vocalization times of arrival differences along the array were used to localize sound sources. Visually observed whales were linked to the sounds they produced. This close observation and study is uniquely possible due to the length and close range of minke contacts.

ACCOMPLISHMENTS: Over four-weeks, we encountered 61 minke whales and had extended (up to 11 hours/encounter), close contacts occurring with the majority. We recorded over 21 hours in the direct presence of at least 45 animals, a very large database compared to all previous records. This unique

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situation allows for lengthy observations and study that is unheard of for the minke, and most any other whale.

SIGNIFICANCE: The success of 1997 pilot study proved that the Great Barrier Reef offers an unique opportunity to study the acoustic ecology of minke whales. This is because of the high density of inquisitive whales. This minke vocalization had been recorded remotely for 15 years by Australian researchers, yet its source remained unknown. The vocalization is also strikingly similar to the "boing" a sound recorded by North Pacific researchers for 40 years.

PUBLICATIONS AND ABSTRACTS:

Gedamke, J., D.P. Costa, and A. Dunstan. 1997. New vocalization definitively linked to the minke whale. Journal Acoustical Society of America 102(2):3121-3122.

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13. ABSTRACT (Maximum 200 words) Calls of minke whales, <i>Balaenoptera acutorostrata</i> , off the coast of NE Australia in July of 1997 were recorded utilizing a newly described population, where minke whales maintain long contacts with vessels. Recordings were made in the presence of minke whales aboard the vessel "Undersea Explorer" using a calibrated, two dimensional hydrophone array. Over four-weeks, we encountered 61 minke whales and had extended (up to 11 hours/encounter), close contacts occurring with the majority. We recorded over 21 hours in the direct presence of at least 45 animals. The high density of inquisitive minke whales at the Great Barrier Reef offers an unique opportunity to study their acoustic ecology.				
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